

1. A system to adjust colors in any kind of electronic display comprising:

a color screen used as a display using primary colors of a color space;

a system processor sending downloading display data to a display driver

circuit; and

5 a display driver circuit comprising:

a processor interface logic providing the interface between said system processor and said display driver circuit;

a display adjust circuit adjusting the display data received from said system processor via said processor interface logic and writing said modified display data into a display RAM;

10 one or more color adjust registers;

a display RAM for storing the adjusted display data, and

a screen driver controlling said screen and sending said adjusted display data to said screen.

2. The system of claim 1 wherein said color space is RGB.

3. The system of claim 1 wherein said color space is CMY.

4. The system of claim 1 wherein said screen is a LCD display.

5. The system of claim 4 wherein said LCD display is a CSTN display.

6. The system of claim 4 wherein said LCD display is a DSTN display.

7. The system of claim 1 wherein said screen is a TFT display.
8. The system of claim 1 wherein said screen is an OLED display.
9. The system of claim 1 wherein said display adjust circuit is using two color adjust registers to store the adjustment data defining the amount of adjustments.
10. The system of claim 9 wherein said color adjustment registers are storing the adjustment data for each of all primary colors of the color space selected.
11. The system of claim 10 wherein said color adjustment registers are comprising three bits to store the adjustment information for each of two primary colors and four bits for a third primary color.
12. The system of claim 11 wherein said color adjustment registers are comprising three bits to store the adjustment information for each of red color and blue color and four bits for green color.
13. The system of claim 1 wherein said display data are stored in said display RAM using a 16-bit word.
14. The system of claim 13 wherein said 16-bit word comprises five bits each for two primary colors and six bits for a third primary color.

- 15.** The system of claim **14** wherein said 16-bit word comprises five bits for each red and blue 5 and 6 bits for green.
- 16.** The system of claim **1** wherein the color display data is linearly scaled by programmable amount.
- 17.** The system of claim **16** wherein the display data are adjusted for each color according equations which are implemented in said display adjust circuit using a hardware description language.
- 18.** The system of claim **17** wherein the display data are adjusted for each color according equations which are implemented in said display adjust circuit using register transfer level (RTL) language.
- 19.** The system of claim **16** wherein each primary color of the color display data is linearly scaled by programmable amount and wherein said programmable amount is defined in case of a required decrease of a primary color according to the equation

$$\text{color}_{\text{adjust}} = \text{color}_{\text{unadjust}} - \text{color}_{\text{unadjust}}/2^n,$$

wherein $\text{color}_{\text{adjust}}$ is the value of the adjusted color, $\text{color}_{\text{unadjust}}$ is the value of unadjusted color, and n is a parameter set for each primary color according to the desired adjustment.

20. The system of claim 16 wherein each primary color of the color display data is linearly scaled by programmable amount and wherein said programmable amount is defined in case of a required increase of a primary color according to the equation

$$\text{color}_{\text{adjust}} = \text{color}_{\text{unadjust}} + \text{color}_{\text{unadjust}}/2^n,$$

5 wherein $\text{color}_{\text{adjust}}$ is the value of the adjusted color, $\text{color}_{\text{unadjust}}$ is the value of unadjusted color, and n is a parameter set for each primary color according to the desired adjustment.

21. The system of claim 1 wherein said display driver circuit is implemented as an IC.

22. The system of claim 1 wherein said display driver circuit is implemented as an ASIC.

23. A method to adjust colors in any kind of electronic display comprising:

providing a display screen, a system processor, and a display driver circuit comprising a processor interface logic, a display adjust circuit, one or more color adjust registers, a display RAM and a screen driver circuit;

5 define adjustment data for each primary color used by said display screen to adjust said colors according to the properties of said screen;

store said adjustment data for each primary color in one or more registers providing one or more bits for each primary color;

10 define a word structure to operate the unadjusted display data and to store the adjusted display data in a display RAM wherein for each primary color a defined number of bits is assigned;

implement an algorithm to adjust each of the primary colors, used by said screen, in said display adjust circuit using a hardware description language; download display data from system processor into display adjust circuit; 15 adjust display data in display adjust circuit according to algorithm implemented earlier and according adjustment data defined and stored earlier and write adjusted display data into display RAM; and forward adjusted display data from the display RAM to the display screen by the screen driver circuit.

24. The method of claim 23 wherein said primary colors belong to RGB color space.

25. The method of claim 23 wherein said primary colors belong to CMY color space

26. The method of claim 23 wherein said word structure comprises a 16-bit word.

27. The method of claim 26 wherein said 16-bit word comprises five bits each for two primary colors and six bits for a third primary color.

28. The method of claim 27 wherein said 16-bit word comprises five bits for each red and blue 5 and 6 bits for green.

29. The method of claim 23 wherein said hardware description language is register transfer level (RTL) language.

30. The method of claim 23 wherein said algorithm to decrease a primary color value is

$$\text{color}_{\text{adjust}} = \text{color}_{\text{unadjust}} - \text{color}_{\text{unadjust}}/2^n,$$

wherein $\text{color}_{\text{adjust}}$ is the value of the adjusted color, $\text{color}_{\text{unadjust}}$ is the value of unadjusted color, and n is a parameter set for each primary color according to the desired adjustment.

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31. The method of claim 23 wherein said algorithm to increase a primary color value is

$$\text{color}_{\text{adjust}} = \text{color}_{\text{unadjust}} + \text{color}_{\text{unadjust}}/2^n,$$

wherein $\text{color}_{\text{adjust}}$ is the value of the adjusted color, $\text{color}_{\text{unadjust}}$ is the value of the unadjusted color, and n is a parameter set for each primary color according to the desired adjustment.

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32. The method of claim 23 wherein said color adjustment registers are comprising three bits to store the adjustment data for each of two primary colors and four bits for a third primary color.

33. The method of claim 32 wherein said color adjustment registers are comprising three bits to store the adjustment data for each of blue and red and four bits for green.

34. The method of claim 33 wherein said adjustment data for the color red are the following bit combinations:

011 = +25% (2-bit shift and add),

010 = +12.5% (3-bit shift and add),

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001 = +6.3% (4-bit shift and add),

000 = no change (default value),
101 = -6.3% (4-bit shift and subtract),
110 = -12.5% (3-bit shift and subtract),
111 = -25% (2-bit shift and subtract)

35. The method of claim 33 wherein said adjustment parameters for the color blue are the following bit combinations:

011 = +25% (2-bit shift and add),
010 = +12.5% (3-bit shift and add),
5 001 = +6.3% (4-bit shift and add),
000 = no change (default value),
101 = -6.3% (4-bit shift and subtract),
110 = -12.5% (3-bit shift and subtract),
111 = -25% (2-bit shift and subtract)

36. The method of claim 32 wherein said adjustment parameters for the color green are the following bit combinations:

0100 = +25% (2-bit shift and add)
0011 = +12.5% (3-bit shift and add)
5 0010 = +6.3% (4-bit shift and add)
0001 = +3.1% (5-bit shift and add)
0000 = no change (default value)
1001 = -3.1% (5-bit shift and subtract)
1010 = -6.3% (4-bit shift and subtract)

10 $1011 = -12.5\%$ (3-bit shift and subtract)

$1100 = -25\%$ (2-bit shift and subtract).